Rev. 1

0068334

Shaw™
Shaw E & I, Inc.

Geotechnical Laboratory
PO Box 4339
1570 Bear Creek Road
Oak Ridge TN 37830
865/482-6497

CERTIFICATE OF ANALYSIS

Stephen Trent
Fluor Hanford, Inc.
825 Jadwin Avenue
Richland, Washington 99352

November 3, 2004

This is the Certificate of Analysis for the following samples:

Shaw Project ID:	**Eberline - Hanford**
Shaw Project Number:	**100846.22000000**
Client Sampling Authorization Form No.	F03-025
Client Sample Data Group:	H2720
Date Received by Lab:	September 20, 2004
Number of Samples:	Two (2)
Sample Type:	Soil

I. Introduction/Case Narrative

Two soil samples were received by the Shaw Geotechnical Laboratory on September 20, 2004. Samples were submitted for determination of bulk density and sieve analysis. The sample numbers received were B19445 and B19446.

Please see Appendix A, Sample Number Cross Reference List; Appendix B, Analysis Results; and Appendix C, Chain-of-Custody/Sample Receipt Records.

"I certify that this data package is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature."

Reviewed and Approved:

Ralph Cole
Laboratory Manager, Geotechnical Services

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II. Analytical Results/Methodology

REFERENCES: United States Army Corps of Engineers (USACE), Engineer Manual 1110-2-1906, *Laboratory Soils Testing*, appendix II, 1970; United States Environmental Protection Agency, SW846, *Test Methods for Examining Solid Waste, Physical/Chemical Methods*, 3rd ed., Nov 1986 (EPA SW-846). Annual Book of ASTM Standards, Section 4, Construction, Volume 04.08, *Soil and Rock (I)*, and Volume 04.09, *Soil and Rock (II)*, 2004. Shaw Environmental and infrastructure, Standard Operating Procedures.

Moisture Content of Soil and Rock	**ASTM D 2216**
Bulk Density of Soils	**EM 1110-2-1906**
Particle-size Analysis of Soils	**ASTM D 422**
Calcium Carbonate Content	**ASTM D 4373**
Specific Gravity of Soil	**ASTM D 854**

III. Quality Control

Quality control checks such as duplicates and spikes (QC samples), are not normally applicable to geotechnical testing. This is due largely to the inability of obtaining samples with known characteristics, the heterogenous nature of the samples, and quality control procedures built-in to the analytical method.

QC measures to ensure accuracy and precision of test results include the following:

- 100% verification of all numerical results - raw data entries, transcriptions and calculations entered by lab technicians are checked, recalculated and verified. Most data calculations are performed by computer programs.
- Data validation through test reasonableness - summaries of all test results for individual reports are reviewed to determine the overall reasonableness of data and to determine the presence of any data that may be considered outliers.
- Quality control procedures are built into most standardized geotechnical procedures. For example, liquid limit and plastic limit analyses call for re-analyses and specify acceptance criteria.
- Routine instrument calibration - instruments, gauges and equipment used in testing are calibrated on a routine basis. All instrument calibration follows ASTM or manufacturer guidelines.

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- Maintenance of all past calibration records - calibration records and certification documents of all instruments, gauges and equipment are updated routinely and maintained in the Quality Control Coordinators Quality/Operations files.

- Certified and trained personnel - all technicians are certified by the National Institute for Certification of Engineering Technicians (NICET) in geotechnical soil testing, and are trained in the application of standard laboratory procedures for geotechnical analyses as well as the quality assurance measures implemented by Shaw.

- Quantitative analyses frequently used in geotechnical/physical testing programs do not use QC tools common to wet chemistry or radiochemistry laboratories. Measures not employed in the analysis of samples reported in this report include: laboratory control samples (LCS), blanks, matrix spikes (MS), duplicate analyses, dilutions, digestions, correction factors, surrogate sample analyses, detection limit determinations, control charts, and/or tentatively identified compounds (TICs).

IV. Data Qualification

None.

Appendix A
Sample Cross-Reference List

November 3, 2004
Stephen Trent
Fluor Hanford, Inc.
Shaw Project Name: Eberline Hanford
Shaw Project No. 100846.22000000
SAF No. F03-25
SDG No. H2720

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SAMPLE NUMBER CROSS-REFERENCE LIST

LAB SAMPLE NO.	CLIENT SAMPLE NO.	MATRIX
BC0448	B19445	Soil
BC0449	B19446	Soil

Appendix B
Sample Test Results

MOISTURE CONTENT

PROJECT NAME
Eberline Hanford

PROJECT NUMBER
100846.22000000

LAB SAMPLE NO.	CLIENT SAMPLE NO.	MOISTURE, % ASTM D 2216	MOISTURE , % SW846	SOLIDS, % SW846
BC0448	B19445	6.0	5.7	94.3
BC0449	B19446	3.7	3.5	96.5

ASTM D 2216 results are based on dry sample weight.
SW846 results are based on wet sample weight.
Solids content is determined by subtracting the SW846 moisture (%) from 100.

D Hynes
9/23/05

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November 3, 2004
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BULK DENSITY/DRY DENSITY
EM-1110-2-1906, APPENDIX II

PROJECT NAME: **Eberline - Hanford**

PROJECT NUMBER: **100846.22000000**

LAB SAMPLE NUMBER	CLIENT SAMPLE NUMBER	AVERAGE LENGTH, inches	AVERAGE DIAMETER, inches	WET WEIGHT, grams	MOISTURE CONTENT, %	BULK DENSITY, pcf	DRY DENSITY, pcf
BC0448	B19445	6.0010	3.8862	2672.84	4.6	143.1	136.8
BC0449	B19446	5.3418	3.8810	1649.2	3.7	99.4	95.9

Moisture content calculated by ASTM D 2216 based on sample dry weight.
Bulk density is the weight of wet sample divided by the volume of the wet sample (as-received).
Dry density is the weight of the dry sample solids divided by the volume of the original sample.

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PARTICLE-SIZE DISTRIBUTION
ASTM D 422

Project Name Eberline Hanford

Project No. 100846.22000000

Field Sample No. B19445

Lab Sample No. BC0448

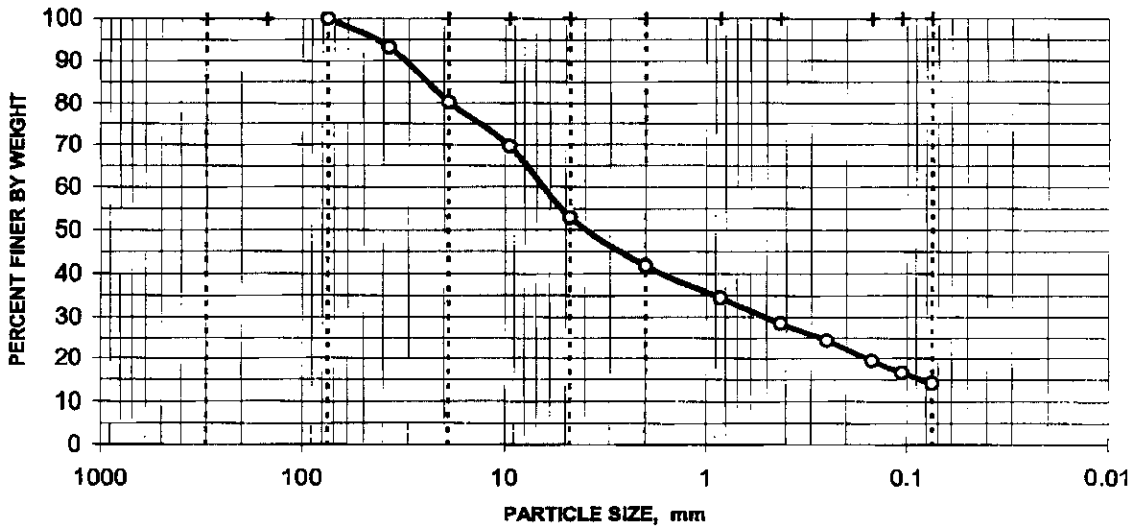
Moisture Content = 4.6%
based on dry sample weight

SIEVE ANALYSIS

	Sieve No.	Diameter mm	Percent Finer
COARSE	3"	75.000	100.0%
	1.5"	37.500	93.2%
	0.75"	19.000	80.3%
	0.375"	9.500	69.6%
	#4	4.750	53.0%
	#10	2.000	41.8%

	Sieve No.	Diameter mm	Percent Finer
FINE	#20	0.850	34.5%
	#40	0.425	28.5%
	#60	0.250	24.4%
	#100	0.149	19.4%
	#140	0.106	16.6%
	#200	0.075	14.1%

DISTRIBUTION CURVE



47.0% Gravel 38.8% Sand 14.1% Silt/Clay

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PARTICLE-SIZE DISTRIBUTION
ASTM D 422

Project Name Eberline Hanford

Project No. 100846.22000000

Field Sample No. B19446

Lab Sample No. BC0449

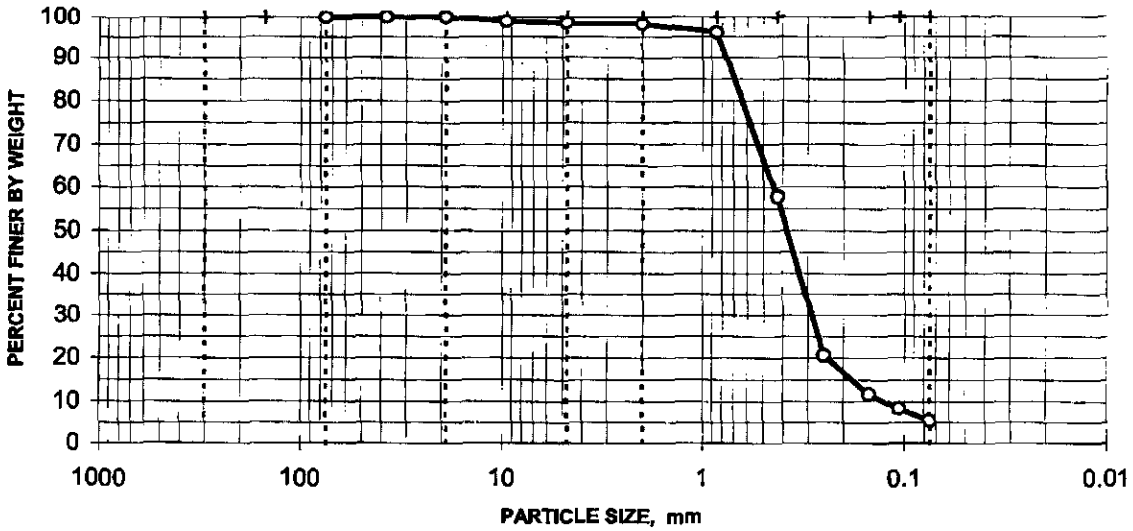
Moisture Content = 3.7%
based on dry sample weight

SIEVE ANALYSIS

	Sieve No.	Diameter mm	Percent Finer
COARSE	3"	75.000	100.0%
	1.5"	37.500	100.0%
	0.75"	19.000	100.0%
	0.375"	9.500	98.9%
	#4	4.750	98.5%
	#10	2.000	98.1%

	Sieve No.	Diameter mm	Percent Finer
FINE	#20	0.850	96.0%
	#40	0.425	57.7%
	#60	0.250	20.6%
	#100	0.149	11.7%
	#140	0.106	8.4%
	#200	0.075	5.4%

DISTRIBUTION CURVE



1.5% Gravel 93.0% Sand 5.4% Silt/Clay

Appendix C
Chain-of-Custody and Request-for-Analysis Records

PAGE 1 Eberline Srvces CHAIN OF CUSTODY ORD # R4-09-101

09/14/04 15:07:48 WORK ID: SAP# F03-025 SDG H2720

RCVD: 09/14/04 DUE: 10/29/04 KEEP: 10/29/05 DISP: S

DASH	SAMPLE IDENTIFICATION	STORED	TESTS				
01A-S	B19445	SHAW	DISPOS	E331S	E333S	E335S	BC 0448
02A-S	B19446	SHAW	DISPOS	E331S	E333S	E335S	BC 0449

RELEASED BY	DATE	TRANSFERRED TO	DATE	RECEIVED BY	DATE
[signature]	9/17/04	Shaw		[signature]	9.20.04

FLUOR Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	F03-025-165	PAGE 1 OF 1

COLLECTOR Pope/Pfister/Hughes/Wiberg	**COMPANY CONTACT** TRENT, STEVE	**TELEPHONE NO.** 373-5689	**PROJECT COORDINATOR** TRENT, SJ	**PRICE CODE** 8N **DATA TURNAROUND**
SAMPLING LOCATION 216-S-20; ~~202ft-204.5ft~~ 191.5'-194' 15m 9-8-04	**PROJECT DESIGNATION** 200-LW-1/LW-2 Characterization - Soil		**SAF NO.** F03-025	**AIR QUALITY** ☐ 45 Days / 45 Days
ICE CHEST NO. GPP-03-021	**FIELD LOGBOOK NO.** HNF-N-356 1	**COA** 119143ES10	**METHOD OF SHIPMENT** Federal Express	
SHIPPED TO Shaw Group	**OFFSITE PROPERTY NO.** See PTR 14113		**BILL OF LADING/AIR BILL NO.** See PTR 14113	

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegitation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
~~NA~~ DT 9/13/04
Tie to Rad Screen
B191H8

SPECIAL HANDLING AND/OR STORAGE
N/A
SDG# H2720

PRESERVATION	None	None
TYPE OF CONTAINER	Moisture Resistant Cont	Liner
NO. OF CONTAINER(S)	1	1
VOLUME	200mL	1000mL 3322g
SAMPLE ANALYSIS	Moisture Content - D2216;	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B19445	SOIL	9-8-04	1115	X	X

BC 0448

CHAIN OF POSSESSION — **SIGN/ PRINT NAMES**

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
R. PFISTER / [signature]	9/8/04 1340	MO-026 FRIG #1	9/8/04 1340
MO-026 Frig #1	9/13/04 1130	Greg Thomas / [signature]	9/13/04 1130
Greg Thomas / [signature]	9/13/04 1130	Fed Ex	
Fed Ex	9/14/04 9:15	[signature]	9/14/04 11:00
[signature]	9/17/04 7:00	Fed Ex	9/17/04
		[signature]	9-20-04 1000

SPECIAL INSTRUCTIONS

(1)Particle Size (Dry Sieve) - D422; Bulk Density - D2937;

LABORATORY SECTION	RECEIVED BY	TITLE	DATE/TIME
FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

0000012

FLUOR Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	F03-025-166	PAGE 1 OF 1

COLLECTOR	COMPANY CONTACT	TELEPHONE NO.	PROJECT COORDINATOR	PRICE CODE 8N	DATA TURNAROUND
Pope/Pfister/Hughes/Wiberg	TRENT, STEVE	373-5689	TRENT, SJ	AIR QUALITY ☐	45 Days / 45 Days
SAMPLING LOCATION 216-S-20; ~~230R-232-SR~~ 238-240-5	**PROJECT DESIGNATION** 200-LW-1/LW-2 Characterization - Soil		**SAF NO.** F03-025		
ICE CHEST NO. GPP-03-021 AB 9/7/04	**FIELD LOGBOOK NO.** HNF-N-356 1	**COA** 119143ES10	**METHOD OF SHIPMENT** Federal Express		
SHIPPED TO Shaw Group	**OFFSITE PROPERTY NO.** See PTR 14113		**BILL OF LADING/AIR BILL NO.** See PTR 14113		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegitation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
~~NR~~ DT 9/13/04
Tie to Rad Screen
B19HB

SPECIAL HANDLING AND/OR STORAGE
N/A
SDG # H2720

PRESERVATION	None	None										
TYPE OF CONTAINER	Moisture Resistant Cont	Liner										
NO. OF CONTAINER(S)	1	1										
VOLUME	200mL	1000mL										
SAMPLE ANALYSIS	Moisture Content - D2216;	SEE ITEM (1) IN SPECIAL INSTRUCTIONS 2290g										

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME									
B19446	SOIL	9-13-04	0715	X	X							

BC 0449

CHAIN OF POSSESSION

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
JSHipe/Alley	9-13-04 1040	MO-026/Fridge #1	9-13-04 1040
MO-026/Fridge #1	9/13/04 1130	Greg Thomas	9/13/04 1130
Greg Thomas	9/13/04 1130	Fed Ex	
Fed Ex	9/14/04 9:15		9/14/04 11:00
			9-20-04 1000

SIGN/ PRINT NAMES

SPECIAL INSTRUCTIONS

(1)Particle Size (Dry Sieve) - D422; Bulk Density - D2937;

LABORATORY SECTION	RECEIVED BY	TITLE	DATE/TIME
FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

CS 1000000